1. An interferometric system for measuring a radius of curvature of a measurement object, said system comprising:

a tunable coherent radiation source capable of emitting a radiant energy beam having a characteristic wavelength and of scanning the characteristic wavelength over a range of wavelengths;

an unequal path interferometer which during operation includes a reference object and the measurement object and which receives a portion of the radiant energy beam from the tunable radiant energy source and generates an optical interference pattern;

a detecting system including a detector for receiving the optical interference pattern; and

a system controller connected to the tunable radiant energy source and the detecting system, said controller programmed to cause the tunable radiant energy source to scan the characteristic wavelength over said range of wavelengths while concurrently monitoring the optical interference pattern via the detecting system and further programmed to calculate the radius of curvature of a surface of the measurement object from the monitored optical interference pattern.

2. The system of claim 1, wherein the system controller is further programmed to calculate a phase shift in the measured optical interference pattern caused by scanning the characteristic wavelength, wherein the system controller uses the calculated phase shift to compute said radius of curvature.

3. The system of claim 2, wherein the system controller is further programmed to compute an optical path difference from the calculated phase shift, wherein the system controller uses the computed optical path difference to compute said radius of curvature.

4. The system of claim 3 wherein the system controller is programmed to use numerical simulation to compute said radius of curvature.

5. The system of claim 3 wherein the system controller is programmed to recursively compute said radius of curvature.

6. The system of claim 3 wherein during operation the reference and measurement objects form an interferometric cavity with the measurement object approximately in a null position and the system controller is further programmed to correct the computed radius of curvature to take into account possible initial positioning errors of the measurement object relative to said null position.

7. The system of claim 6 wherein during operation the reference and measurement objects form an interferometric cavity with the measurement object in a null position having a null order of n, wherein n is an integer at least as great as 2, and wherein the system controller is programmed to compute the null order for the interferometric cavity.

8. The system of claim 1, wherein the tunable radiant energy source is a tunable light source.

9. The system of claim 1, wherein the unequal path interferometer is a Fizeau interferometer.

10. The system of claim 1 further comprising a wavelength change monitor configured to monitor changes in the characteristic wavelength of the radiant energy source, wherein said system controller is arranged to receive output from the wavelength change monitor and is programmed to calculate the radius of curvature of the surface of the measurement object from a monitored change in the wavelength and the monitored optical interference pattern.

11. The system of claim 10, wherein the system controller is programmed to calculate the change in the characteristic wavelength and a phase variation of the optical interference caused by scanning the characteristic wavelength over the range of wavelengths.

12. The system of claim 11, wherein the system controller is further programmed to use the calculated wavelength change and the calculated phase variation to calculate an optical path difference in the interferometer, wherein the system controller uses the computed optical path difference to compute said radius of curvature.

13. The system of claim 10, wherein the wavelength change monitor includes a detector and an unequal fixed path length interferometer.

14. The system of claim 13, wherein the unequal fixed path length interferometer is one of an optical fiber interferometer, a Michelson interferometer, and a Mach-Zehnder interferometer.

15. The system of claim 1, wherein the reference object has a curved surface.

16. The system of claim 15, wherein the curved surface is concave.

17. An interferometric system for use with a measurement object, comprising:

a tunable coherent radiation source capable of emitting a radiant energy beam having a characteristic wavelength and of scanning the characteristic wavelength over a range of wavelengths;

a wavelength change monitor configured to monitor a change in the characteristic wavelength of the radiant energy beam;

an interferometer which during operation includes a reference object and the measurement object to form an interferometric cavity and which during operation also receives the radiant energy beam from the tunable light source and generates an optical interference pattern therefrom; and

a detecting system comprising a detector for receiving the optical interference pattern.

18. The system of claim 17, wherein the tunable radiant energy source is a tunable light source.

19. The system of claim 17, wherein the interferometer is an unequal path interferometer.

20. The system of claim 17 further comprising a system controller connected to the tunable radiant energy source, the wavelength change monitor and the detecting system, said controller programmed to cause the tunable radiant energy source to scan the characteristic wavelength over said range of wavelengths while concurrently monitoring

the optical interference pattern via the detecting system and further programmed to calculate the radius of curvature of a surface of the measurement object from the monitored optical interference pattern.

21. The system of claim 20, wherein the system controller is further programmed to calculate a phase shift in the measured optical interference pattern caused by scanning the characteristic wavelength, wherein the system controller uses the calculated phase shift to compute said radius of curvature.

22. The system of claim 21, wherein the system controller is further programmed to compute an optical path difference from the calculated phase shift, wherein the system controller uses the computed optical path difference to compute said radius of curvature.

23. The system of claim 22 wherein the system controller is programmed to use numerical simulation to compute said radius of curvature.

24. The system of claim 22 wherein the system controller is programmed to recursively compute said radius of curvature.

25. A method for interferometrically determining a radius of curvature of a curved surface of a measurement object, the method comprising:

positioning the measurement object relative to a reference object to form an interferometric cavity;

scanning a characteristic wavelength of a radiant energy beam over a range of wavelengths;

recording an optical interference signal caused by the interferometric cavity as the characteristic wavelength of the radiant energy beam scans over a range of wavelengths;

extracting a phase variation from the optical interference signal;

determining a relative change in the characteristic wavelength which caused the extracted phase variation;

determining an optical path difference between the reference and measurement objects from the phase variation and the relative change in frequency of the characteristic wavelength; and

calculating the radius of curvature for the curved surface of the measurement object.

26. The method of claim 25, wherein calculating the radius involves using the optical path difference and a null order of the interferometric cavity.

27. The method of claim 25 further comprising determining a null order of the interferometric cavity.

28. The method of claim 27, wherein determining the null order involves performing mechanical phase shifting.

29. The method of claim 25, wherein positioning of the measurement object involves positioning it relative to the reference object so as to form a confocal cavity.

30. The method of claim 25, wherein positioning of the measurement object involves positioning it relative to the reference object so as to form a retroreflecting cavity having a null order equal to n, wherein n is an integer that is at least as large as 2.

31. The method of claim 25, wherein positioning the measurement object involves positioning it relative to the reference object to form a confocal cavity having a null order of 1.

32. The method of claim 25 further comprising extracting a 2-dimensional phase variation from the optical interference signal.

33. The method of claim 32 further comprising using the 2-dimensional phase information to correct the calculated optical path difference between the reference and measurement objects.

34. The method of claim 25, wherein determining the relative change in the optical frequency of the characteristic wavelength involves monitoring the relative optical frequency change of the characteristic wavelength.